

What is Claimed Is:

1. A startup combustor that is used at startup to warm a fuel reformer characterized by:

a chamber for combusting fuel;

a fuel port connected to the chamber for introducing fuel;

an air port connected to the chamber for introducing air;

an ignition source connected to the chamber for igniting fuel and air introduced thereto;

a filter within the chamber, which is capable of preventing a substantial portion of any soot contained in the air or fuel or which can develop from combusting the fuel with the ignition source from passing through the filter; and

a controller for regulating the introduction of air and fuel to the chamber and capable of maintaining an excess air ratio to regenerate the filter.

2. A startup combustor according to claim 1 further characterized by having a means for detecting soot accumulation onto the filter.

3. A startup combustor according to claim 2 wherein the means for detecting soot accumulation onto the filter comprises a differential pressure gauge.

4. A startup combustor according to claim 2 wherein the means for detecting soot accumulation onto the filter comprises determining the operational history of the combustor.

5. A startup combustor according to claim 1 characterized in that the controller maintains a excess air ratio of about 1.5 to about 2.8 to regenerate the filter.

6. A startup combustor according to claim 1 characterized by being able to predict the filter outlet temperature from the amount of soot accumulated on the filter and

performing an operation that lowers the outlet temperature of the combusted gases exiting the filter.

7. A startup combustor according to claim 6 further characterized by an inlet port downstream of the filter and before a reformer, which is capable of introducing water to the combusted gases to cool the inlet temperature of the reformer.

8. A startup combustor according to claim 1 further characterized by having two or more filters arranged in series downstream of the ignition source.

9. A process for operating a startup combustor to regenerate a filter, the process comprising:

combining air and a hydrocarbon fuel to form an air hydrocarbon fuel mixture;
combusting the mixture to form a combustion gas that can also contain soot;
passing the combusted gas through a filter to collect any soot onto the filter; and
when a predetermined amount of soot has collected on the filter, regenerating the filter by introducing an excess air ratio of about 1.5 to about 2.8 for a set period of time to oxidize the collected soot on the filter.

10. The process of claim 9 further comprising estimating the level of accumulated soot onto the filter.

11. The process of claim 10 wherein the level of accumulated soot onto the filter is estimated by a differential pressure gauge.

12. The process of claim 10 wherein the level of accumulated soot onto the filter is estimated by the operational history of the startup combustor.

13. The process of claim 9 further comprising determining the filter outlet temperature based on the level of soot accumulated on the filter and performing an operation that lowers the outlet temperature of the combusted gases exiting the filter.

14. The process of claim 13 wherein the operation that lowers the outlet temperature of the combusted gases exiting the filter is achieved by introducing water to the combusted gases.

15. The process of claim 9 further comprising passing the combusted gas through one or more additional filters arranged in series to collect the soot.